Claims

Claims 1-36 (Canceled)

37. (Original) A method for providing electrical energy to an electrical device in an environment having a first and a second temperature region comprising the steps of:

providing a means for transmitting ambient energy collected in the first temperature region,

providing a thermoelectric device having a first side and a second side,

providing the means for transmitting the ambient energy collected in the first temperature region in communication with the first side of the thermoelectric device, and

providing the second side of the thermoelectric device in communication with the second temperature region.

38. (Original) The method of claim 38 wherein the thermoelectric device is selected from the group consisting of metallic wire thermocouples, discrete element semiconductors, and thin film semiconductors assembled in alternating p- and n-type arrays, and combinations thereof.

39. (Original) The method of claim 38 wherein the metallic wire thermocouples are selected from the group consisting of iron-constantan; copper-constantan; chromel-alumel; chromel-constantan; platinum-rhodium alloys and tungsten-rhenium alloys, and combinations thereof.

40. (Original) The method of claim 38 wherein the discrete element semiconductors assembled in alternating p- and n-type arrays are connected electrically in series, parallel, and in combinations thereof.

41. (Original) The method of claim 40 wherein the p-type arrays are selected from the group consisting of bismuth telluride, lead telluride, tin telluride, zinc antimonide, cerium-iron antimonide, silicon-germanium, and combinations thereof.

42. (Original) The method of claim 40 wherein the n-type arrays are selected from the group consisting of bismuth telluride, lead telluride, cobalt antimonide; silicon-germanium, and combinations thereof.

43. (Original) The method of claim 38 wherein the thin film semiconductors are selected as having p-type materials fabricated of bismuth telluride, lead telluride, tin telluride, zinc antimonide, cerium-iron antimonide, silicon-germanium, and combinations thereof sputter deposited as thin films on a substrate; and n-type semiconductors fabricated of bismuth telluride, lead telluride, cobalt antimonide, silicon-germanium and combinations thereof sputter deposited as thin films on a substrate.

44. (Original) The method of claim 43 wherein the thin film semiconductors are selected as bismuth telluride sputter deposited as thin films on a substrate.

45. (Original) The method of claim 37 further comprising the steps of providing a second means for transmitting ambient energy collected in the second temperature region in communication with the second side of the thermoelectric device and in communication with the second temperature region.

46. (Original) The method of claim 37 wherein the step of transmitting ambient energy is performed by means selected from collecting ambient energy, focusing ambient energy, transferring ambient energy, and combinations thereof.

47. (Original) The method of claim 46 wherein the step of transferring ambient energy is performed by means selected from convection, conduction, radiation, and combinations thereof.

48. (Original) The method of claim 37 wherein the temperature difference between the first temperature region and the second temperature region is between about -18°C and 38°C.

49. (Original) The method of claim 37 wherein the temperature difference between the first temperature region and the second temperature region is between about -18°C and 10°C.

50. (Original) An apparatus for generating electrical energy from an environment having a first temperature region and a second temperature region comprising a thermoelectric device having a first side and a second side wherein the first side is in communication with a means for transmitting ambient thermal energy collected in the first temperature region.

51. (Original) The apparatus of claim 50 wherein the thermoelectric device is selected from the group consisting of metallic wire thermocouples and discrete element semiconductors assembled in alternating p- and n-type arrays, and combinations thereof.

52. (Original) The apparatus of claim 51 wherein the metallic wire thermocouples are selected from the group consisting of iron-constantan; copper-constantan; chromel-alumel; chromel-constantan; platinum-rhodium alloys and tungsten-rhenium alloys, and combinations thereof.

53. (Original) The apparatus of claim 51 wherein the discrete element semiconductors assembled in alternating p- and n-type arrays are connected electrically in series, parallel, and in combinations thereof.

54. (Original) The apparatus of claim 53 wherein the p-type arrays are selected from the group consisting of bismuth telluride, lead telluride, tin telluride, zinc antimonide, cerium-iron antimonide, silicon-germanium, and combinations thereof.

55. (Original) The apparatus of claim 54 wherein the n-type arrays are selected from the group consisting of bismuth telluride, lead telluride, cobalt antimonide; silicon-germanium, and combinations thereof.

56. (Original) The apparatus of claim 51 wherein the discrete element semiconductors are selected as thin film semiconductors of bismuth telluride sputter deposited as thin films on a substrate.

57. (Original) The apparatus of claim 50 further comprising a second means for transmitting ambient energy collected in the second temperature region in communication with the second side of the thermoelectric device.

58. (Original) The apparatus of claim 50 wherein the means for transmitting ambient energy is selected from an ambient energy collection means, an ambient energy focusing means, an ambient energy transmission means, and combinations thereof.

59. (Original) The apparatus of claim 58 wherein the ambient energy transferring means is selected from a convection means, a conduction means, a radiation means, and combinations thereof.

60. (Original) The apparatus of claim 50 further comprising a means for alternately storing and discharging electrical energy produced by the thermoelectric device.

61. (Original) The apparatus of claim 50 wherein the a means for alternately storing and discharging electrical energy produced by the thermoelectric device is selected from the group consisting of a battery, a capacitor, a supercapacitor, and combinations thereof.

62. (Original) The apparatus of claim 50 further comprising at least one sensor powered by electrical energy discharged from the means for alternately storing and discharging electrical energy produced by the thermoelectric device.

63. (Original) The apparatus of claim 62 further comprising at least one transmitter powered by electrical energy discharged from the means for alternately storing and discharging electrical energy produced by the thermoelectric device and capable of transmitting data gathered by the sensor.

64. (Original) The apparatus of claim 50 further comprising at least one voltage amplifiers for amplifying the voltage of electrical energy generated by the thermoelectric device.

65. (Original) The apparatus of claim 62 further comprising at least one microprocessor capable of processing the data gathered by at least one of the sensors.

66. (Original) The apparatus of claim 62 further comprising at least one data storage means capable of storing the data gathered by at least one of the sensors.

Claims 67-85 (Canceled)